FOREST PEST CONDITIONS IN CALIFORNIA-1968

A PUBLICATION OF
THE CALIFORNIA FOREST PEST CONTROL ACTION COUNCIL

THE CALIFORNIA FOREST PEST CONTROL ACTION COUNCIL was formed in 1951 in recognition of the need for close cooperation among land managers concerned with forest pest problems. Primarily an advisory and coordinating group, the Council sponsors a Statewide cooperative forest pest detection survey; publishes an annual report of forest pest conditions; studies, endorses, and supports desirable pest control actions, reviews control needs and programs, and provides a forum for the exchange of pest control information. The California State Board of Forestry has designated the Council as its official advisory group for forest insect, disease and animal problems. The Council comprises the following organizations:

Boyce Thompson Institute
California Forest Protective Association
California Redwood Association
State of California: Departments of Agriculture, Conservation, Fish and Game, Parks and Recreation, and the University of California
U. S. Department of Agriculture, Forest Service
U. S. Department of the Interior, Bureaus of Indian Affairs, Land Management, Sport Fisheries and Wildlife, and the National Park Service
Western Wood Products Association

THIS REPORT, FOREST PEST CONDITIONS IN CALIFORNIA - 1968, was based largely on information provided by the California Cooperative Forest Pest Detection Survey. In 1968, 634 reports were received: 290 for insects, 325 for diseases, and 19 for animal pest damage.

The report was prepared by the Forest Service and the Bureau of Sport Fisheries and Wildlife in cooperation with other member organizations of the Council. It was duplicated and distributed by the California Division of Forestry.

THE COVER PHOTO: Blister rust canker on a young sugar pine. Since its introduction into California in 1929, blister rust has become epidemic in many parts of Siskiyou, Shasta and Trinity Counties. From Tehama County to Placer County, infection on sugar pine is scattered, common in places, and severe in some stands. From El Dorado County south to Mariposa County blister rust occurs only occasionally. It has not yet been found in Madera and Fresno Counties but in 1968 it was found as far south as Tulare County. (See page 8.)

Sacramento January 1969

HIGHLIGHTS OF PEST CONDITIONS

1968

STATUS OF INSECT PESTS. Losses from insect pests were below normal in California forests in 1968. Bark beetle infestations accounted for most of the tree mortality with one medium sized and several localized outbreaks active during the year. Fortunately, most bark beetle problems occurred under conditions where suppression measures could be economically and effectively carried out. Notable buildups of scale infestations occurred but these problems probably will be nonpersistent or amenable by natural control factors. While defoliator damage was very minor, the destructive Douglas-fir tussock moth was again found in northern California. The natural control factors suppressing the lodgepole needle miner may be weakening. A severe outbreak of grasshoppers seriously damaged valuable pine plantations near Mt. Shasta.

STATUS OF DISEASE PESTS. Intensified scouting revealed a number of new centers of white pine blister rust. The southernmost infection, near Johnsondale, Tulare County, extended the known sugar pine infection zone about 175 miles southward. Three needle diseases new to California, or new to the host, were found. Air pollution in the Angeles and San Bernardino National Forests continued to cause tree mortality.

STATUS OF ANIMAL PESTS. Deer depredation continued as the most extensive animal damage problem for forest regeneration in the State. Some degree of deer damage to every species of commercial conifers was reported. Porcupine damage appears to be decreasing throughout their range.

STATUS AND CONTROL OF INSECT PESTS

WESTERN PINE BEETLE, Dendroctonus brevicomis. The most serious forest insect problem in California in 1968 was the continuation of the western pine beetle epidemic at McCloud Flats, Siskiyou County. Mid-summer evaluations there showed two years of heavy tree killing on 7,000 acres of dense 60- to 80-year-old stands of ponderosa pine. Control of this epidemic began in October by salvage logging. The Forest Service expects 2 million board feet of beetle-infested timber, plus 1 million abandoned, to be logged by May 1969. Included in this volume is over 7,000 currently infested trees which must be removed before beetle emergence next spring. Logging of infested trees on private lands in the infestation area will be completed before beetle emergence in the spring of 1969. Supplemental spraying with lindane, to treat unmerchantable infested trees, is planned to complete the control job.

Western pine beetle epidemic - McCloud Flats, Siskiyou County. Approximately three million board feet of second-growth ponderosa timber was salvaged during the late fall of 1968 in an effort to suppress a serious outbreak of the western pine beetle.

Other problem areas where control of the western pine beetle is needed are: Basket Pass and Bradshaw, Kern County; Hume Lake Recreation Area, Fresno County; Bass Lake Recreation Area and Cedarbrook, Madera County; Montgomery Ridge and Buck Meadows, Mariposa County; Beardsley Lake, Tuolumne County; Grissly Flat, El Dorado County; South Fork of the Yuba River near Bridgeport, Nevada County; and Transfer Point, Tehama County. Control in these locations is advisable to protect valuable recreation areas or curtail increasing trends of bark beetle activity. Below normal rainfall during the summer and fall in the southern Sierra favored bark beetle development. Control will be done by salvage logging of infested trees. Some supplemental spraying may be needed in recreation areas.

In southern California, the western pine beetle became more destructive in 1968 following several years of only endemic activity. The most serious problems developed at Lake Arrowhead, San Bernardino County, and Julian, San Diego County. The increasing trend in beetle activity near Julian was encouraged by the aftermath of the Pine Hills Fire in 1967. The uptrend in other areas coincided with deficient spring precipitation throughout the southern part of the State. Control was applied to the Lake Arrowhead infestation, along with other maintenance control areas, but agreement for cooperative control of the Julian infestation has not yet been developed.

FIR ENGRAVER BEETLE, Scolytus ventralis. Increased tree killing by the fir engraver beetle was noticed in 1967 and new infestation centers were detected in the early months of 1968. On-the-ground examinations of several infestations showed heavy tree killing from 1967 attacks, with the trees fading in 1968.

Detection and evaluation information available indicates the 1968 generation killed fewer trees than the 1967 generation, and the activity of this beetle probably declined to an endemic level. However, recent outbreak areas will be kept under close observation in the spring of 1969 to detect additional successful 1968 attacks. Recent epidemic areas include: Eight Mile Ridge, Buck Mountain and Swayback Ridge, Humboldt County; Shasta Butte Ranch and an area two miles southeast of Weed, Siskiyou County; Red Rock and White Rock, Trinity County; Snow Mountain, Lassen County; and Joseph Creek, Modoc County.

MOUNTAIN PINE BEETLE, Dendroctonus ponderosae. The mountain pine beetle killed fewer trees during 1968 in California than in recent years. Activity of this beetle in ponderosa pine and lodgepole pine was at a very low level. A more serious problem was the mountain pine beetle attacking and killing scattered mature sugar pine in numerous areas, particularly on the Sequoia, Stanislaus, Lassen and Klamath National Forests. The infestation on the Sequoia National Forest was directly associated with numerous lightning strikes on very large trees. Beetle activity in young-growth sugar pine stands declined during the year. Control of these scattered infestations continued by logging infested trees.

JEFFREY PINE BEETLE, Dendroctonus jeffreyi. Scattered single trees and small groups of Jeffrey pine harboring the Jeffrey pine beetle were detected at Brightman Flats, Tuolumne County; and Kern Plateau around Nine Mile Creek, Tulare County. At Brightman Flats this infestation was associated with heavy dwarf mistletoe infections while on the Kern Plateau most of the activity centered around lightning damaged trees. At Brightman Flats infested trees will be removed by logging. On the Kern Plateau immediate control is not possible but eventually silvicultural treatment, to log high-insect risk trees, will suppress bark beetle depredation in that area.

Direct control, with chemical spraying, was continued in maintenance control areas of southern California where high endemic losses continue at Big Bear and Snow Valley, San Bernardino County. Jeffrey pine beetle activity in the remainder of the State declined to a low level.

DOUGLAS-FIR BEETLE, Dendroctonus pseudotsugae. Following the destructive epidemic of 1966, the Douglas-fir beetle infestation declined sharply in 1967 and further subsided to an endemic level in 1968.

PINE ENGRAVER BEETLE, Ips spp. Only limited damage resulted from pine engraver beetle infestations despite the deficient moisture received during the spring of 1968. Eventually, by late summer and early fall, some successful top killing of living trees occurred in the central and southern Sierra Nevada Range, and in southern California where moisture stress was probably the most pronounced. In several locations, the western pine beetle attacked ips weakened trees causing localized epicenters of complete tree kill.

During the spring of 1968 some suppression of ips populations in slash and storm-damaged material was carried out by salvage logging and chemical spraying. No later damage to living trees was reported in these areas. Additional control work will be considered only in the areas where ips and the western pine beetle are both involved. In southern California, this control activity will be part of the maintenance control program. In the Sierra Nevada problem areas, salvage logging is planned.

OTHER BEETLES IN THE BARK AND TWIGS OF TREES. The California flatheaded borer, Melanophila californica, continued to kill Jeffrey pine in southern California; the most damage was in the Laguna Mountains of San Diego County. The flatheaded fir borer, Melanophila drummondi, killed some small and medium sized Douglas-fir trees at Bierce Ridge, Hughes Saddle, and Tannery Gulch in Trinity County.

Early frost damage and an infestation of a death-watch beetle, Ernobius sp., probably californicus (family Anobiidae) caused severe dieback of twigs of Jeffrey pine at Lake Hemet, Riverside County. A twig beetle, Pityophthorus sp., was found killing twigs of bristlecone pine in the Methuselah Grove, Inyo County. Conspicuous twig beetle damage was reported on ponderosa pine at Stump Springs, Fresno County, and on white fir at Reverse Peak, Mono County.

SAPSUCKING INSECTS. A severe infestation of the white pine needle scale, Phenacaspis pinifoliae developed on 1,280 acres of Jeffrey and lodgepole pine in the community of South Lake Tahoe, El Dorado County. Property owners there are very apprehensive of the weakening effect of this outbreak on these pines as they are used for shade and ornamental purposes.

A matsucoccus scale persisted into 1968 and severely defoliated mature sugar pine trees along five miles of the Calahan-Cecilville Highway in Siskiyou County. Taxonomic studies have not definitely established the species of this scale. It is now designated as Matsucoccus sp. near acalyptus.

An extensive infestation of Matsucoccus acalyptus damaged single-leaf pinyon pine on 2,200 acres at Ozena, Ventura County.

DEFOLIATING INSECTS. The low level of defoliating insect damage continued in California forests in 1968. The silver-spotted tiger moth, Halisidota argentata, was the most widespread defoliator of conifers in the State, but caused only minor damage. Detection reports on this insect were received from northwestern California, Mt. Shasta, and the central and southern Sierra Mountains. The caterpillars were much more numerous than usual in some locations, particularly on the Jackson State Forest, Mendocino County; and Pine City Mountain, Mariposa County.

Needle miner infestations in lodgepole pine and white fir, caused by Coleotechnites milleri and Epinotia meritana respectively, continued at a low level. However, it has been noted that the lodgepole needle miner, which is now midway through the two-year life cycle, has suffered considerably less than normal natural mortality. A persistent infestation of Coleotechnites sp., in Jeffrey pine at Snow Valley, San Bernardino County, increased from 25 acres to 105 acres in extent.

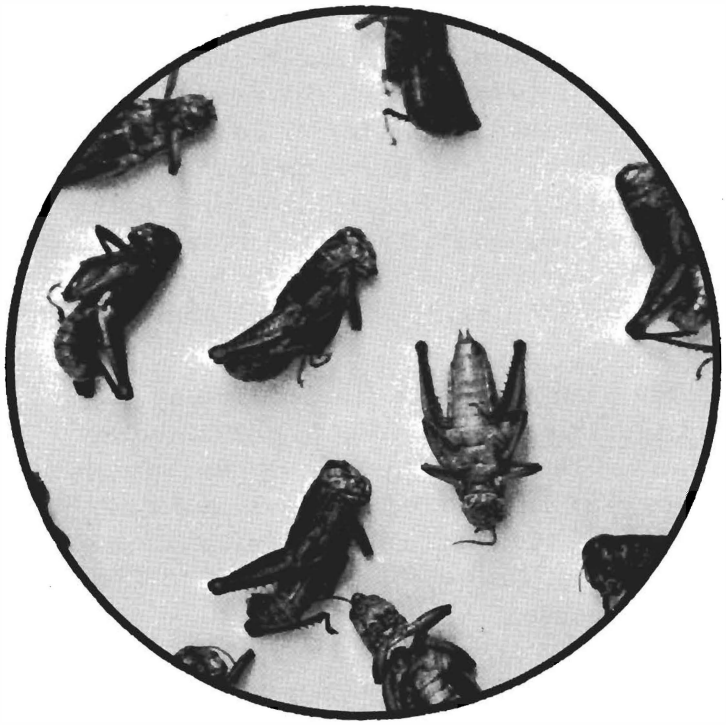
A small number of caterpillars and adult male moths of the potentially destructive Douglas-fir tussock moth, Hemerocampa pseudotsugata, were collected at Wilcox Springs near Hat Creek, Shasta County, and on Latour State Forest.

No control efforts to suppress conifer defoliators were undertaken in 1968.

Several reports of defoliators on hardwood trees and brush species were received in 1968. The Great Basin tent caterpillar, Malacosoma fragile was found in increasing numbers in several areas of northern California. Damage also occurred on elm from feeding of the elm leaf beetle, Pyrrhalta luteola; fruit and shade trees by the red-humped caterpillar, Schizura concinna; alder by the alder flea beetle, Altica ambiens; and oak by the California oakworm, Phryganidia californica.

INSECTS DAMAGING PLANTATIONS AND YOUNG TREES. Bradynotes obesa, a little known wingless grasshopper native to northern California, severely damaged recently established pine plantations on the western slope of Mt. Shasta, Siskiyou County in 1968. Surveys showed damage present on approx-

ximately 4,200 acres with nearly all of the young trees destroyed on 800 acres. A control program was conducted by the Agricultural Research Service to suppress this epidemic. Malathion, at the rate of 8 ounces per acre, was applied to the 4,200-acre infestation by fixed-wing aircraft. Since some eggs may have been deposited by the grasshoppers before the insecticide was applied, follow-up surveys are planned in the spring of 1969 to see if additional control is needed.



Grasshopper damage, Siskiyou County. Young ponderosa pine in plantations on the west slope of Mt. Shasta were severely damaged by grasshoppers in the spring of 1968. Grasshopper control was undertaken on 4,200 acres.

Reproduction weevil damage increased slightly in 1968 above the low damage level of recent years. Cylindrocopturus eatoni was found damaging ponderosa pine plantations at Spring Hill, Siskiyou County; McCauley Hill, Mariposa County; and sugar pine at Iron Mountain, El Dorado County. Cylindrocopturus furnissi was active in the Kettenpom Plantation, Trinity County. Weevil damage was closely associated with severe brush competition or poor site conditions in all cases reported.

Pitch moth infestations on the Lava Butte Plantation of the Sequoia National Forest show no evidence of decline. Moths identified as Petrova edemoidana, Hilarograph regalis, Elatobia fuliginosella, and Bondia sp., were previously reared from infested trees. The infestations have persisted since 1965 and although no tree mortality resulted, the trees are suffering severe bleeding and some growth deformation.

TABLE 1

INSECT CONTROL ACTIONS RECOMMENDED BY THE COUNCIL

INFESTATION AREA	ESTIMATED ACREAGE	COUNTY	INSECT	HOST	RECOMMENDED ACTION
BARK BEETLES					
Basket Pass	2,000	Kern	Db	PP	Log and spray
Bass Lake	9,000	Madera	Db,Ips,Dm	PP,SP	Log and spray
Cedarbrook	1,000	Madera	Db	PP	Log and spray
Hume Lake	500	Fresno	Db	PP	Log and spray
McCloud Flats	10,000	Siskiyou	Db	PP	Log and spray--research
Mountain Home State Forest	1,000	Tulare	Db	PP	Log
Mountain Meadow Reservoir	1,000	Plumas	Dj	JP	Surveillance
Northern California	10,000	Modoc, Placer, El Dorado	Sv	WF	Evaluate
South Shore Lake Tahoe	1,000	El Dorado	Dm	LP	Evaluate
DEFOLIATORS					
Callahan	600	Siskiyou	Ma	SP	Surveillance
Hat Creek and Latour State Forest	3,000	Shasta	Hp	WF	Surveillance
Ozena	2,500	Ventura	Ma	Pe	Surveillance
Sentinel, Crooked and Wet Meadows	2,200	Mono	Gm	LP	Surveillance and research
Sierra N.F., Yosemite N.P. and Sequoia and Kings N.P.	55,000	Madera, Mariposa	Em	RF	Surveillance and research
Snow Valley	105	San Bernardino	C sp.	JP	Surveillance
South Shore Lake Tahoe	1,280	Eldorado	Pp	JP,LP	Evaluate
PLANTATIONS AND EXPERIMENTAL AREAS					
Institute of Forest Genetics	2,000	El Dorado	Db,Ips	PP	Treat infested trees
Plantations	4,000	Siskiyou	Ce,Gh	PP,JP	Detection, evaluation and control as needed
Seed Production Areas		Northern California	C&S	PP	Evaluation, research
STATE AND NATIONAL PARKS					
San Jacinto State Park	11,000	Riverside	Mc,Db	JP,CP,PP	Maintenance control
Cuyamaca Rancho State Park	8,000	San Diego	Mc,Db	JP,PP	Maintenance control
Lassen Volcanic National Park	3,000	Shasta, Lassen	Dj,Db,Dm	JP,PP,SP,LP	Maintenance control
Sequoia and Kings Canyon	8,500	Fresno	Db,Dm	PP,SP	Maintenance control
Sequoia and Kings Canyon	400	Tulare	Gm	LP	Surveillance
Yosemite National Park	57,700	Mariposa, Tuolumne	Db,Dm,Dj	PP,SP,JP,LP	Maintenance control
Yosemite National Park	9,000	Tuolumne	Gm	LP	Surveillance and research
Anza Borrego	500	San Diego	Db,Mc	CP	Maintenance control
Heart Bar	1,300	San Bernardino	Dj	JP	Maintenance control
SOUTHERN CALIFORNIA FOREST RECREATION AREAS					
Aqua Tibia	400	San Diego	Db,Ips	CP	Control according to plan
Arrowhead-Crestline	47,000	San Bernardino	Dm,Db,Ips,Dj	PP,CP,JP	San.-treatment and maintenance control
Arroyo-Seco District	3,000	Los Angeles	Db,Ips,Mc	PP,CP,JP	San.-treatment and maintenance control
Big Bear Valley	8,800	San Bernardino	Dj,Ips,Mc,Sv	JP,WF	Log and maint. control according to plan
Corte Madera	1,600	San Diego	Db,Ips,Mc,Dv	CP,JP,PP	Maint. control according to plan
Cuyamaca	12,000	San Diego	Db,Ips,Mc	CP	Maintenance control
Idyllwild-San Jacinto	37,000	Riverside	Mc,Db,Ips,Dm	PP,CP,JP	San.-treatment and maintenance control
Laguna Mt.	9,700	San Diego	Db,Mc	CP,JP	Maint. control according to plan
Lost Valley	4,000	San Diego	Db,Ips	CP	Maint. control according to plan
Mt. Baldy District	1,500	Los Angeles	Ips,Dj,Dm,Mc,Db	PP,JP,CP	San.-treatment and maintenance control
Mt. Pinos District	7,900	Ventura, Kern	Mc,Ips	JP	San.-treatment and maintenance control
Palomar Mt.	6,600	San Diego	Db,Sv	CP,WF	Maintenance control
Ranger Peak-Figueroa Mt.	700	Santa Barbara	Db,Ips,Dv	PP,CP	Maintenance control according to plan
San Gorgonio District	25,000	San Bernardino	Db,Dj,Ips	PP,JP,CP	San.-treatment and maintenance control
Valyermo District	14,600	Los Angeles	Mc,Ips	JP,WF	San.-treatment and maintenance control
Wrightwood	2,000	San Bernardino	Mc,Ips	JP	Maintenance control
Julian	4,000	San Diego	Db,Ips	CP	Evaluation

Abbreviations Used in Tables

INSECTS

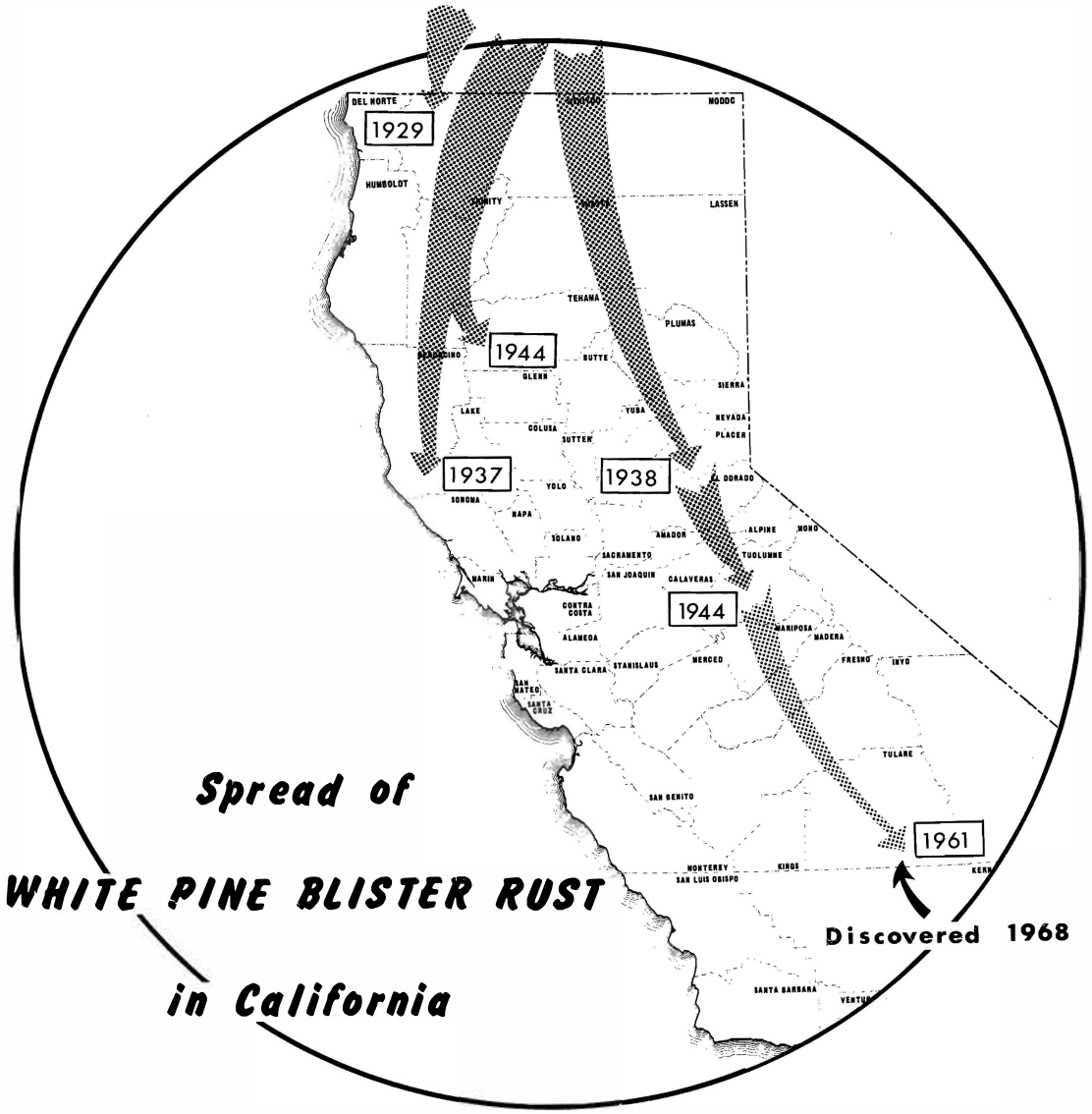
C sp. - Jeffrey pine needle miner	Dm - Mountain pine beetle	Ips - Pine ips
Ce - Pine reproduction weevil	Dp - Douglas-fir beetle	Ma - Matsucoccus sp.
Gm - Lodgepole needle miner	Dv - Red turpentine beetle	Mc - California flatheaded borer
C&S - Cone and seed insects	Em - Fir needle miner	Pp - White pine scale
Db - Western pine beetle	Gh - Grasshoppers	Sv - Fir engraver
Dj - Jeffrey pine beetle	Hp - Douglas-fir tussock moth	

HOST

CP - Coulter pine	PP - Ponderosa Pine
JP - Jeffrey pine	RF - Red fir
LP - Lodgepole pine	SP - Sugar pine
Pe - Pinyon pine	WF - White fir

STATUS AND CONTROL OF DISEASES

WHITE PINE BLISTER RUST. The most significant event was the discovery of blister rust on sugar pines at Mountain Home State Forest, Tulare County. In the Mountain Home area there is one large infection center covering several hundred acres and containing several thousand infected trees. Elsewhere in the general area, the disease appears to be confined to a few small centers totalling no more than 100 acres and a few hundred trees. These centers are distributed over a gross area of several thousand acres.



The discovery at Mountain Home State Forest extended the known location of the rust 150 air miles south of the southernmost infection center known in 1967. Later in the summer, two more infection centers comprising only a few trees, were found near Johnsondale, about 25 air miles south of Mountain Home.

The rust appears to have entered into the Mountain Home area in 1961. A buildup on pines occurred in 1964. These are the same two years in which buildup occurred on pines further north.

Continuing the intensified blister rust scouting program, begun in 1967, the Forest Service early this summer issued a number of contracts to consulting foresters for scouting to be done on and adjacent to the Mendocino, Lassen, Plumas, Tahoe and Eldorado National Forests. The Stanislaus National Forest continued its regular force-account scouting program. With the discovery of the infection center at Mountain Home State Forest, the scouting program was enlarged and additional contracts for scouting on the Sierra and Sequoia National Forests were issued in midsummer.

The accelerated scouting program revealed significant changes in the behavior of blister rust. Within the sugar pine type, the rust has established itself on most streams, and along major segments of many streams, in the Sierra Nevada as far south as the Mokelumne River. South of the Mokelumne, it has been found at 10 locations on the Stanislaus National Forest, the furthest south being on Neds Gulch near Yosemite National Park boundary in the vicinity of the Merced Grove of bigtrees; and at Mountain Home State Forest and adjacent areas, Tulare County. No rust has been found in Yosemite National Park, the Sierra National Forest, the Hume Lake District of the Sequoia National Forest, and the Sequoia and Kings Canyon National Parks.

ROOT DISEASES. In 1968, new centers of Fomes annosus, Armillaria mellea, Verticicladiella wagenerii and Polyporus schweinitzii were found.

The roots of 320 recently windthrown trees comprising 8 species were inspected for diseases in June. The survey showed about 60 percent of the trees had one or more root diseases present; and 36 percent of the infected trees already had 11 percent or more of their root system dead or decayed at time of blowdown. The diseased and decayed roots undoubtedly contributed to the windthrow.

Fomes annosus. The root disease caused by this fungus has been reported from many areas throughout the timbered portion of the State. During 1968, 65 new centers were found. These new centers were scattered among campgrounds, thinning areas, timber sales, Christmas tree areas, and other areas where stumps resulted from cutting green trees.

Armillaria mellea. Armillaria root disease is the most common of the root diseases. It is present in most of the timbered areas of California. Forty-five new centers were reported in 1968. In addition, of 320 windthrown trees examined in El Dorado, Calaveras and Tuolumne Counties, the roots of 167 or over 52 percent were infected with A. mellea.

Verticicladiella wagenerii. The black-staining root disease was found at five new infection centers during 1968. The disease was found for the first time in Siskiyou County at two places near McCloud, and in Plumas County near Quincy. Additional centers were located in El Dorado County near Blodgett Forest and in East Creek in the northeast corner of Lassen County.

NEEDLE DISEASES. Two new centers of red band needle blight caused by the fungus Scirrhia pini (Dothistroma pini) were reported, but as yet not verified. One was in a plantation south of Fortuna and the other was in a nursery in Scotia. Foliage samples from these centers have been requested for verification. Damage is still present at most or all of the previously known locations; damage is increasing at some locations while little change has occurred at others.

Needle diseases reported for the first time in California or for the first time on the host were:

* Lophodermium durilabrum on foxtail pine.

* An unknown and probably unnamed Hypodermella on knobcone pine.

* Rhabdocline pseudotsuga on bigcone Douglas-fir.

Other needle diseases reported and identified during 1968 were:

* The three snow molds Herpotrichia nigra on white fir, red fir and mountain hemlock; Neopeckia coulteri on lodgepole, whitebark and western white pine; and Phacidium infestans var. abietis on white fir, were more common than usual.

* Elytroderma deformans was reported on Jeffrey and ponderosa pine from many areas and caused severe damage locally. This disease also was found on needles and twigs of lodgepole pine at North Battle Creek Reservoir in Shasta County.

* Other needle diseases found on pines were: Lophodermium nitens and Hypodermella arcuata on sugar pine; Naemacyclus niveus on Monterey, Coulter and ponderosa pine, Hypodermella montana and Coryneum cenerium on lodgepole; Lophodermium pinicolium on lodgepole; ponderosa and Jeffrey pine; Dothichiza pithyophila on sugar pine needles and twigs; Diplodia pinea on Coulter pine.

* Needle diseases found on firms were Hypodermella abietis-concoloris, Stegopezizella balsameae and Hypoderma

robustum on white fir; Aticha glomerulosa and Rhabodocline pseudotsuga on Douglas-fir.

* Three diseases on broadleaf trees were causing damage locally. These were Fabrala maculata on toyon; Kabatiella phorodendri on bay tree, and Mycosphaerella effigurata on Oregon ash.

DWARF MISTLETOE. Although new areas are continuously being reported the dwarf mistletoe problem remains more or less static. Of some interest was the finding of dwarf mistletoe, Arceuthobium tsugensis, on both mountain hemlock and western white pine at several locations between Lower Echo Lake and Meeks Bay in El Dorado County. Dwarf mistletoe control projects were carried out on most National Forests through precommercial thinnings.

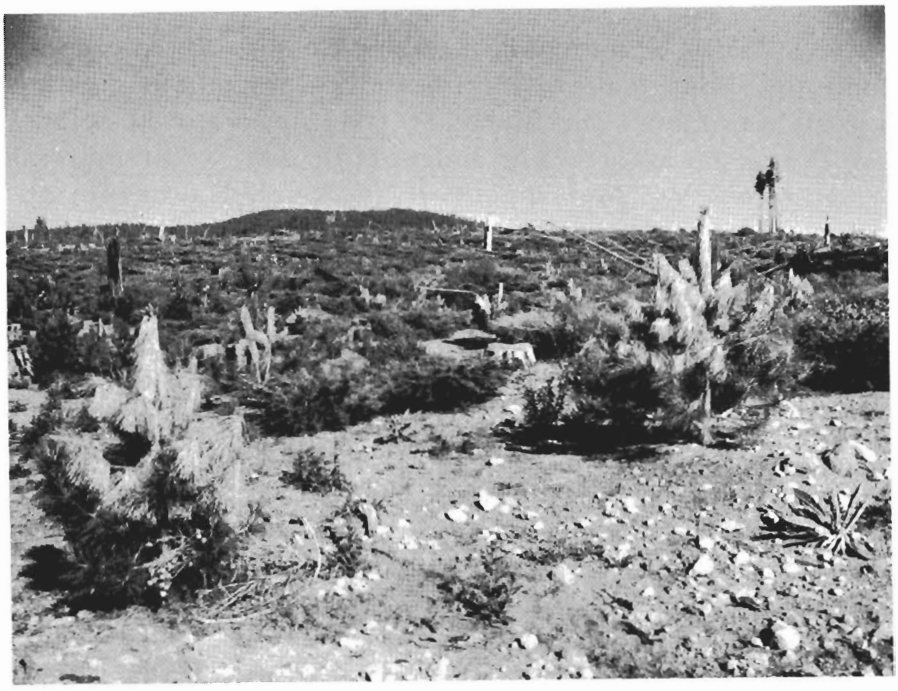
RUSTS. In addition to blister rust, other rusts were: Gymnosporangium libocedri widespread on incense cedar; Cronartium comandrae on young trees at Long Valley Plantation, Lassen County; C. occidentale on pinyon pine and ribes leaves; Peridermium harknessii, western gall rust was reported throughout the State; P. filimentosum on Jeffrey pine; P. stalactiforme on Jeffrey and lodgepole pine; Melampsora abieti-capraearum on willow; Melampsorella caryophyllacearum on red and white fir; Pucciniastrum goeppertiana on needles of white fir and twigs of huckleberry, and Puccinia caricina on ribes leaves.

TWIG DISEASES. The following diseases were found killing or damaging twigs and limbs: Cenangium furruginosum on Jeffrey pine at two widely separated areas; Dothichiza pithyophila on ponderosa pine; Diplodia pinea on ponderosa pine; Dasyscypha arida on red fir and lodgepole pine; another species of Dasyscypha on whitebark pine; Atrapellis piniphila on lodgepole pine; Atropellis pinicola on sugar pine; Microdiscula rubicola on foxtail pine; a species of Sphaeropsis on shorepine; Phomopsis pseudotsugae killed an occasional Douglas-fir in plantations; Diplodia and Scleroderris abieticola on white fir; Cytospora abietis on white and red fir caused heavy damage locally; Cytospora chrysosperma on quaking aspen and willow; a fungus pathogen killing limbs and sprouts on big leaf maple was tentatively identified as Verticillium albo-atrum.

HEART ROTS. Numerous wood rotting fungi were reported. The most common of these was Fomes pini found on Douglas-fir white fir, ponderosa pine, lodgepole pine, and sugar pine. Other heart rot fungi found were: Echinodontium tinctorium on limbs and boles of red and white fir; Fomes officinalis on Douglas-fir and sugar pine, Polyporus sulphureus on red fir; P. abietinus on red and white fir, ponderosa

and Jeffrey pine; P. anceps on Jeffrey and Coulter pine; P. versicolor widespread on both dead conifers and hardwoods; P. amarus on incense cedar; Lentinus lepideus on ponderosa and whitebark pine, and Pholiota adiposa on white fir.

PHYSIOLOGICAL DISORDERS. Winter damage was the most common of the physiological diseases. An extremely cold spell during the last week of December 1967 was accompanied by a strong, dry wind. Numerous mature trees were either snapped off near their base or were blown down exposing their roots. Damage from windthrow was most severe from Placerville, El Dorado County to Pinecrest, Tuolumne County. In some plantations, the tops of trees extending above the snow level were killed or damaged by needle and twig desiccation during this same period. The damage was most pronounced in plantations on or near ridge tops.



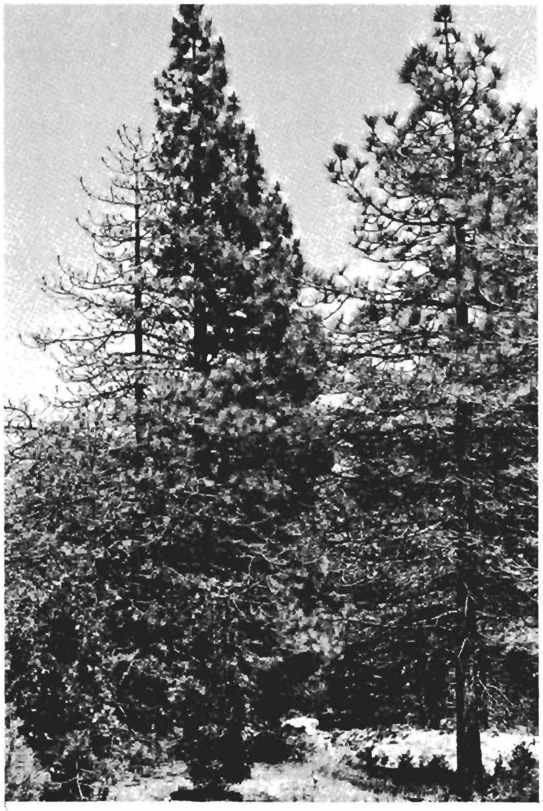
Freeze damage - Ice House Plantation. El Dorado County. Damage occurred during a high, dry, east wind and freezing temperatures. Damage was confined almost entirely to trees growing on ridge tops and north slopes.

Numerous reports of chemical damage were received. Mature trees were damaged a few killed from different chemicals sprayed along power lines, telephone lines, roads, around power houses, power substations and homes. Younger trees, in plantations sprayed for brush control, were damaged at some areas. Damage from spray in Christmas tree plantations was also reported.

PHOTOCHEMICAL OXIDANT AIR POLLUTION DAMAGE. (X-Disease) Severe photochemical oxidant air pollution injury to ponderosa pine continued in the Angeles and San Bernardino National Forests, adjacent to the polluted Los Angeles basin. Mortality of ponderosa pine is frequent but often associated with bark beetle attack in the terminal stages of damage. Jeffrey, Coulter, knobcone pine and bigcone Douglas-fir in natural stands also display advanced defoliation and the chlorotic mottling of the needles, both symptoms of oxidant injury. Monterey pine in Christmas tree plantations in the basin show moderate injury.

Two new areas are under continuing observation to confirm or disprove possible oxidant injury. In Santa Cruz County, stands of ponderosa and Monterey pine display typical oxidant injury symptoms. The suspected pollution source is San Jose according to findings from initial air sampling. The second area is at the intersection of State Highways 180 and 69 east of Fresno. Fresno has the most severe oxidant records in the San Joaquin Valley. Ponderosa pine is the tree species showing symptoms at this time.

Detection surveys are in progress in other localities of the State where oxidant monitoring stations have recorded amounts of total oxidant exeeding 0.15 ppm for significant duration and frequency. New high oxidant concentrations were recorded at several southern California monitoring stations in the summer of 1968. The outlook for effective control remains very poor.



Smog-damaged ponderosa pine near Lake Arrowhead, San Bernardino County. The thin foliage of the tree on the left is a symptom of severe damage. Air pollution from the Los Angeles basin is causing damage to ponderosa pine, Jeffrey pine and bigcone Douglas-fir in the San Bernardino Mountains of southern California.

NURSERY DISEASES. The continuing program of soil fumigation before seeding held losses in forest nurseries to a low level in 1968.

MISCELLANEOUS DISEASES. Two species of Ceratocystis, C. minor and C. minuta were found inside the bark of dead and dying incense cedar. A myxomycete Licea sp., was also found in the same area. Two other myxomycetes were found during the summer. One, Lamroderma sauteri, appearing as tiny black spheres on stalks, were on living needles and twigs of western white and sugar pine. The other, Trichia varia, appeared as small, brown cushions on living sugar pine twigs.

STATUS AND CONTROL OF ANIMAL PESTS

BEAVER. Three beaver damage complaints were received. Damage increased in these three areas, but the number of damage incidents dropped. Trees attacked were aspen, cottonwood and willow.

BIRDS. Birds eating seeds of all coniferous tree species were noted on three reports. The amount of damage was unknown and static.

BLACK BEAR. Five incidents were reported of black bear damage in the northern coastal counties. Bear damage was increasing. Species damaged were Douglas-fir, Monterey pine and redwood.

DEER. The twenty-three deer damage reports came from all areas of the State. Nearly every tree species was involved. Deer damage remains high and static. No damage reduction was attempted.

DUSKY-FOOTED WOODRATS. Seven reports of woodrat damage were received showing an increase in reported damage. Most of the reports indicated that damage was static. Species damaged include cedar, Douglas-fir and redwood. The northern coastal counties and Los Angeles County were involved.

ELK. Three cases of elk damage were reported in Humboldt and Del Norte Counties. In each case the damage was reported to be static. Tree species involved were Douglas-fir, Monterey pine and redwood.

MEADOW MICE. Two reports were received of meadow mouse damage in northern coastal counties. The damage was minor and static. Tree species were not named.

Deer damage to white fir, Humboldt County. Deer depredation continues to be the most serious animal damage problem in the State. These trees would be two-to-three times larger if they had not been browsed.

MOUNTAIN BEAVER. Humboldt and Del Norte Counties reported two incidents of mountain beaver damage. Species affected include Douglas-fir, hemlock, and redwood of the one- to-ten-year-age class. The damage is remaining static. Trapping and lethal baiting were tried in Del Norte County, but the problem still exists.

POCKET GOPHER. Fourteen reports of pocket gopher damage were received. This is a one hundred percent increase in complaints. Most sources report the damage rate as static and the number of acres and trees affected show a decrease. All species of pine were included.

PORCUPINE. Porcupine damage reports dropped to fourteen, a decrease of one-third. All statistics indicate a decrease in damage. Reports show that the damage rate is quite variable between areas. Species most affected were ponderosa and Jeffrey pine. Porcupine bait blocks were used in many areas with varied results. Winter hunting was helpful in a few situations.

RABBITS. Rabbit damage was reported in five areas. One area had serious damage. Otherwise damage was static and localized. Nearly all species of plantation stock sustained damage.

SEED-EATING RODENTS. These rodents consumed immeasurable amounts of natural conifer seeds. Endrin was used as a repellent on all direct seedings. Ten-eighty grain bait was used on 3,210 acres of public lands to reduce damage to direct seedings of conifers. This damage continues to be severe where either or both of these control methods are not used.

White-footed deer mouse (peromyscus). These rodents eat large, immeasurable quantities of conifer seed annually. To reduce deer mouse populations, grain treated with 1080 is used to bait regeneration areas prior to direct seeding.

TREE SQUIRRELS. Three reports of tree squirrel damage were received. The damage was located in the northwest area of the State. Tree species involved were Douglas-fir and redwood of the ten- to-twenty-year-age class. The damage rate is increasing.

DOMESTIC STOCK. Damage from livestock was reported at six locations. Plantation stock of Douglas-fir, Jeffrey pine and ponderosa pine were involved. The damage rate was static but some relief was obtained by cooperation of stock owners.

TABLE 2

SUMMARY OF ANIMAL DAMAGE REPORTS*
FISCAL 1967-68

ANIMAL	TREE SPECIES	AGE CLASS	NO. OF TREES	ACRES DAMAGED	PLANTATION OTHER	DAMAGE INCREASING OR DECREASING
Beaver	Aspen Cottonwood Willow	All Classes	350	165	Other	Increasing
Birds	All Species	Seeds	Unknown	Unknown	Other	Static
Black Bear	Douglas-Fir Monterey Pine Redwood	10-30	Unknown	Unknown	Other	Increasing
Deer	Coulter Pine Douglas-Fir Eucalyptus Jeffrey Pine Knobcone Pine Monterey Pine Ponderosa Pine Red Fir Redwood Sugar Pine White Fir	1-15	251,970	31,459	Both	Static-Severe
Dusky-Footed Woodrat	Douglas-Fir Redwood Cedar	All Classes	1,900	300	Both	Static
Elk	Douglas-Fir Monterey Pine Redwood	1-15	--	6,500	Both	Static
Meadow Mice	All Species	1-3	--	--	Both	Static-Low
Mountain Beaver	Redwood Some Fir and Pine	1-10	--	500	Other	Static
Pocket Gopher	Bishop Pine Coulter Pine Jeffrey Pine Knobcone Pine Ponderosa Pine Scotch Pine Sugar Pine	1-10	11,133	325	Plantation	Static
Porcupine	Douglas-Fir Jeffrey Pine Ponderosa Pine Redwood Sugar Pine White Fir	4-40	10,195	1,560	Both	Static
Rabbits	Bishop Pine Coulter Pine Jeffrey Pine Knobcone Pine Monterey Pine Ponderosa Pine Sugar Pine	1-10	8,000	420	Both	Static
Seed-Eating Rodents	All Species	Seed	No Estimate			
Tree Squirrels	Douglas-Fir Redwood	10-20	500	50	Other	Increasing
Domestic Stock	Douglas-Fir Jeffrey Pine Ponderosa Pine	1-10	7,050	325	Both	Static

* From questionnaires received from land managers throughout the State.

A BRIEF OF RESOLUTIONS ADOPTED BY THE CALIFORNIA PEST CONTROL ACTION COUNCIL - 1968

At its annual meeting in November the Council took the following action:

1. Reiterated last year's recommendation to those forest owners and managers interested in the control of Fomes annosus, especially in high-value areas, that the stumps of all conifer species resulting from felling of green trees be treated with powdered borax (technical grade sodium tetraborate decahydrate) with safranine dye; such treatment to be made immediately after felling to prevent stump infection by spores.

2. Urged for the third consecutive year that action be taken to immediately implement the Fish and Game Commissioner's deer management policy; and further, to revise the big game depredation laws to permit issuance of depredation permits for sufficiently long periods and sufficiently far in advance of actual damage to permit practical conduct of hunting programs.

3. Recognizing that many serious forest pests now confined to other states are capable of causing damage that would impair California's timber production and economy, as well as damage other forest values, recommended that border quarantine inspection stations, under the direction of the California Department of Agriculture, not be closed (as proposed), until such a time that alternative methods to prevent the introduction and spread of pests have been developed and proven.

4. Commended the Forest Service and the companies involved for the excellent and timely salvage job in late 1968 on the McCloud Flats western pine beetle infestation.

5. Requested the incoming officers of the Action Council to (1) re-establish a charter for the Council, (2) reconstruct and reorganize the Committees, (3) update the mailing list and distribute to the Committees, and that (4) minutes of meetings of the Executive Committee and Council be regularly and timely distributed to the Executive Committee.

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